UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,128	02/27/2004	Shin-ichi Uehara	Q80097	4671

23373 7590 04/04/2006	EXAMINER
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ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/787,128	UEHARA ET AL.
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2006*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28,30 and 31* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28,30 and 31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage

        application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)	4)☐ Interview Summary (PTO-413)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)	5)☐ Notice of Informal Patent Application (PTO-152)
Paper No(s)/Mail Date *12/15/2005*.	6)☐ Other: _____.

U.S. Patent and Trademark Office

PTOL-326 (Rev. 7-05)   Office Action Summary   Part of Paper No./Mail Date 03312006

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR

1.17(e), was filed in this application after final rejection. Since this application is eligible for continued

examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the

finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's

submission filed on January 30, 2006 has been entered.

2.   This Office Action is also in response to applicant's amendment filed on December 29, 2005,

which has been entered into the file.

3.   By this amendment, the applicant has amended claims 1-2, 4, 30 and 31. The applicant is

respectfully noted that the claims indicators for claims 4 and 31 are incorrectly put as "previously

presented" while they have been **currently amended**. The applicant is respectfully requested to correct

them in the next communication.

4.   Claims 1-28 and 30-31 remain pending in this application.

Specification

5.   The amendment filed on December 29, 2005 is objected to under 35 U.S.C. 132(a) because it

introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new

matter into the disclosure of the invention. The added material which is not supported by the original

disclosure is as follows: the amended *equation* with the number "0.000291" that is not **explicitly** stated in

the specification.

Applicant is required to cancel the new matter in the reply to this Office Action.

Response to Amendment

6.   The amendment filed on December 29, 2005 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **claims 1, and 2 have been amended** to include the phrase "pixels section being provided periodically in first direction, forming a left line segment and a right line segment wherein said line segments are **perpendicular** to a (or said) first direction". This completely not supported by the specification. The pixels are periodically in the horizontal direction and forming line segments of the pixels that CANNOT be perpendicular to the horizontal direction.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

7.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8.   **Claims 1-2, 5-12, 21-22, 25, 26 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on the newly added matters are set forth in the paragraph above.

Claim Objections

9.   Claims **1, 5-8, 21, 25, 2, 9-12, 22, 26 and 4, 17-20, 24, 28 and 30-31** are objected to because of the following informalities:

(1). **The amended claims 1 and 2 recite the phrase** "pixels ... periodically in a first direction forming a left line segments and a right line segment wherein said line segments are perpendicular to a (or

said) first direction" that is completely confusing and indefinite. The line segments **formed** by the **pixels sections** are in the direction CANNOT be perpendicular to the periodic direction of the pixel section. This feature really makes the display device non-operable and it is not clear what are the scopes of the claims. Furthermore, the phrase "a first direction" recited in claim 1 is confusing and indefinite since it is not clear if this first direction is the same or not as the first direction recited in the earlier part of the claim.

(2). **The amended claim 2** includes the phrase "a distance between the surface of said optical unit and a line segment ... in said first direction ... is set to a distance OD" that is confusing and indefinite since a distance can be measured in many different directions. The "OD" should be referred to *normal* distance.

(3). The phrase "0.000291" recited in claims 2 and 4 is confusing and indefinite since the claims fail to give definition and *physical meanings* to the phrase to make the scopes of the claims clear. *The explicit definition needs to be stated in the claims.* The number now being regard as **arbitrary** number.

(4). The phrase "forming a perpendicular line segment, recited in **claim 30** that is *confusing* and *indefinite* since it is not clear the "perpendicular" is measured with respect to what.

(5). The phrase "the perpendicular distance from a most peripheral line segment out lines segments at the surface of said optical unit to the plane of the viewer's eyes... is set to distance OD" recited **claim 31**, that is really confusing and indefinite since *firstly* it is not clear that *perpendicular* is measured with respect to what. Also what is considered to be the *"most peripheral line segment ...* at the surface of said optical unit"? How can the line segment be *ever at the surface* of the display panel. Judging from Figure 7 of the instant application, the distance "OD" is referred to the *normal distance* between the surface of the optical unit and the plane of the viewer". If the distance is a normal distance between the two, then it does not matters it is measured from which point of the surface of the optical unit.

Claims 5-8, 21, 25, 9-12, 22, 26 and 17-20, 24, 28 inherit the objections from their respective

based claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

10.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

11.   **Claims 1, 5-6 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the**

patent issued to Momochi (PN. 5,528,420) in view of the patent issued to Sandor et al (PN.

5,554,432).

Momochi teaches an *apparatus* for outputting image for stereoscopic vision wherein the

apparatus comprises a *display panel* having a *plurality of pixels* forming pixels sections each section

including a pixel for displaying image for the right eye and a pixel for displaying image for the left eye

respectively, (please see Figures 4 and 5). The apparatus further comprises an *optical unit*, such as the a

lenticular lens consists a plurality of lenses, for re-emitting and refracting image light from the display

panel or pixels to *right eye and left eye of an observer*, respectively, (please see Figures 6-8). It is

implicitly true that the optical unit will establish a three-dimensional visible *range*, which correspond to a

three dimensional region that the left eye of the observer will *only* see the left eye image and the right eye

of the observer will *only* see the right eye image.

With regard to the feature having the lens pitch in the optical unit to be *less than* 0.2 mm, recited

claims 1 and 30, and the feature concerning the image display can be held in a viewer's hands as recited

in claim 30, **Momochi** et al teaches that the lenticular lens could have a width of 200 mm and having a

total of 1000 lenticular lenses, which means the pitch for each of the lenticular lenses is 0.2 mm, (please

see column 10, lines 31-32). But it does not teach explicitly that the lens pitch is less than 0.2mm. **Sandor** et al in the same field of endeavor teaches a *lenticular lens sheet* having a plurality of cylindrical lenses wherein the lens has a pitch ranged between 150 to 250 lines per inch, or 0.169 to 0.102 mm, (please see column 6, lines 1-7). Sandor et al in particularly teaches that for a small *handheld* lenticular sheet autostereographs lens pitch is required to be as high as 300 lines per inch, which means it has a pitch of 0.08 mm, (please see column 4, lines 36-43). It would then have been obvious to one skilled in the art to apply the teachings of **Sandor** et al to modify the stereoscopic image viewing device of **Momochi** to make the lenticular lens having lens pitch less than 0.2 mm for the benefit of making the device capable of being made to have a size that is possibly being **handheld** and being applied into portable devices for viewing stereoscopic images in portable and handheld devices.

Momochi further teaches that the pixel sections form *perpendicular line segments* with respect to the normal direction of the display panel, (with regard to claim 30).

Claim 1 has been amended to include the features that the pixels sections are periodically in a first direction and forming left and right line segments that are perpendicular to a first direction. This phrase has been rejected under 35 USC, 112, first paragraph, for the reasons stated above. It is implicitly true that the pixel sections disclosed by Momochi are periodically in the horizontal direction and they are forming left line segment and right line segments. But it is impossible for them to be perpendicular to the horizontal direction. This feature therefore cannot be examined.

With regard to claim 5, Momochi teaches that pixel sections consists two types of pixels, one for the right eye image and one for the left eye image.

With regard to claim 6, Momochi teaches that the optical unit is lenticular lens.

12.   **Claims 1, 5-8, 21, 25, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ichinose et al (PN. 4,987,487) in view of the patent issued to Sandor (PN. 5,554,432).**

Ichinose et al teaches a *stereoscopic image display* that is comprised of a *display panel*, (please see Figure 9), having a *plurality of pixel sections* (51) wherein each pixel section includes a *pixel* for displaying image for the right eye and a *pixel* for displaying image for the left eye, (51-an, 51-bn), and an *optical unit* (52) consists a *plurality of lenses* for refracting the image light from the pixels such that the left eye image from the pixels (displaying image for left eye) to reach left eye and right eye image from pixels (displaying image for right eye) to reach right eye only so that three-dimensional vision can be observed, (please see columns 6 and 7). Ichinose et al further teaches that the lenticular lenses has a pitch (P) that is defined by the equation:

P = 2l * D/(D+f), (please see equation (1) of column 7), with "2l" denoting the pitch of the left and right *image pixels*, D being the distance between the lenticular lens to a point in the three dimensional visible region defined by the lenticular lens and the display panel, and f being the focal length of the lenticular lens.

For a definite distance D (such as 500 mm) and a definite focal length (such as 1.56 mm), it is implicitly true that, D/(D+f) is always less than one, and the equation can be rewritten as

P< 2l.

From Figure 9, with simple geometric calculation, one can then determine the pitch as follows:

Assuming the angular separation or angular spread of the image light from one of the pixel making with the normal line is a, then the following equations for the paraxial light beam will have the following equation, e/D = tan (a) = l/f', (e is shown in Figure 9). Ichinose et al then teaches that f'=l*D/e, this means:

tan (a) = e/D, or e = D* tan (a), now l is much less than e.

$P < 2l < 2e = 2D^* \tan (a)$. This means the pitch is determined by the relationship of

$P < 2D^* \tan (a)$.

This reference however does not teach that the angular separation to be one minute. However it is known in the art that a general eyesight is 1.0, which means the minimum angular separation, is 1/60 degree or one minute. This then means the pitch is

$P < 2D^* \tan (1')$, wherein $\dot{D}$ could be either at the minimum distance in the three dimensional visible range or at the optimum viewing position).

With regard to the feature having the lens pitch in the optical unit to be *less than* 0.2 mm and the feature concerning the image display can be held in a viewer's hands, as recited in claims 30 and 31, **Ichinose** et al does not teach *explicitly* that the lenticular lens has a lens pitch that is less than 0.2mm. However from the equation above it is possible to design the stereoscopic image display with a lens pitch less than 0.2 mm. **Sandor** et al in the same field of endeavor teaches a *lenticular lens sheet* having a plurality of cylindrical lenses wherein the lens has a pitch ranged between 150 to 250 lines per inch, or 0.169 to 0.102 mm, (please see column 6, lines 1-7). Sandor et al in particularly teaches that for a small *handheld* lenticular sheet autostereographs lens pitch is required to be as high as 300 lines per inch, which means it has a pitch of 0.08 mm, (please see column 4, lines 36-43). It would then have been obvious to one skilled in the art to apply the teachings of **Sandor** et al to modify the stereoscopic image viewing device of **Ichinose et al** to make the lenticular lens having lens pitch less than 0.2 mm for the benefit of making the device capable of being made to have a size that is possibly being **handheld** and being applied into portable devices for viewing stereoscopic images in portable and handheld devices.

Ichinose et al further teaches that the pixel sections form *perpendicular line segments* with respect to the **normal** direction of the display panel, (with regard to claims 30 and 31).

Claim 1 has been amended to include the features that the pixels sections are periodically in a first direction and forming left and right line segments that are perpendicular to a first direction. This

phrase has been rejected under 35 USC, 112, first paragraph, for the reasons stated above. It is implicitly true that the pixel sections disclosed by Ichinose et al are periodically in the horizontal direction and they are forming left line segment and right line segments. But it is impossible for them to be perpendicular to the horizontal direction. This feature therefore cannot be examined.

With regard to claim 5, Ichinose et al teaches that pixel sections consists two types of pixels, one for the right eye image and one for the left eye image.

With regard to claims 6-7, Ichinose et al teaches that the optical unit is lenticular lens. Although this reference does not teach explicitly that the optical unit could also be a fly eye lens, however fly eye lens is well known in the art as an alternative lens unit for providing directivity to direct left eye and right eye images to the proper eye respectively. Since fly eye lenses comprise a plurality of convex lenses it also has the advantage of providing parallax views to more than one dimensional. Such modification would then have been obvious to one skilled in the art for the benefit of using a fly eye lenses design to achieve the stereoscopic image display and to allow the image has more than one directional parallax effect.

With regard to claim 8, Ichinose et al teaches that the display device such as liquid crystal display device can be used in the stereoscopic image display apparatus.

With regard to claims 21 and 25, Ichinose et al does not teach explicitly that the stereoscopic image display device is used in a portable terminal device including the various devices claimed. However it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Madham, 2 USPQ2d 1647 (1987).

13.   **Claims 2-4, 9-20, 22-24, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ichinose et al (PN. 4,987,487).**

Ichinose et al teaches a *stereoscopic image display* that is comprised of a *display panel*, (please see Figure 9), having a *plurality of pixel sections* (51) wherein each pixel section includes a *pixel* for displaying image for the right eye and a *pixel* for displaying image for the left eye, (51-an, 51-bn), and an *optical unit* (52) consists a *plurality of lenses* for refracting the image light from the pixels such that the left eye image from the pixels (displaying image for left eye) to reach left eye and right eye image from pixels (displaying image for right eye) to reach right eye only so that three-dimensional vision can be observed, (please see columns 6 and 7). Ichinose et al further teaches that the lenticular lenses has a pitch (P) that is defined by the equation:

$P = 2l * D/(D+f)$, (please see equation (1) of column 7), with "2l" denoting the pitch of the left and right *image pixels*, D being the distance between the lenticular lens to a point in the three dimensional visible region defined by the lenticular lens and the display panel, and f being the focal length of the lenticular lens.

For a definite distance D (such as 500 mm) and a definite focal length (such as 1.56 mm), it is implicitly true that, $D/(D+f)$ is always less than one, and the equation can be rewritten as

$P < 2l$.

From Figure 9, with simple geometric calculation, one can then determine the pitch as follows:

Assuming the angular separation or angular spread of the image light from one of the pixel making with the normal line is *a*, then the following equations for the paraxial light beam will have the following equation, $e/D = \tan (a) = l/f$, (e is shown in Figure 9). Ichinose et al then teaches that $f=l*D/e$, this means:

$\tan (a) = e/D$, or $e = D* \tan (a)$, now l is much less than e.

$P < 2l < 2e = 2D* \tan (a)$. This means the pitch is determined by the relationship of

$P < 2D* \tan (a)$.

This reference however does not teach that the angular separation to be one minute. However it is known in the art that a general eyesight is 1.0, which means the minimum angular separation, is 1/60 degree or one minute. This then means the pitch is

P< 2D* tan (1'), *wherein D could be either at the minimum distance in the three dimensional visible range or at the optimum viewing position* and **tan(1') takes the value of 0.000291.**

Claim 2 has been amended to include the features that the pixels sections are periodically in a first direction and forming left and right line segments that are perpendicular to a first direction. This phrase has been rejected under 35 USC, 112, first paragraph, for the reasons stated above. It is implicitly true that the pixel sections disclosed by Ichinose et al are periodically in the horizontal direction and they are forming left line segment and right line segments. But it is impossible for them to be perpendicular to the horizontal direction. This feature therefore cannot be examined.

The amendment to claim 2, concerning the perpendicular distance between the surface of the optical unit and the plane of the viewer's eyes that provides the longest width of the three-dimensional visible range, OD, is included in the distance "D" stated above.

The amendment to claim 4, concerning the minimum viewing distance "ND" between the surface of the optical unit and the plane of the viewer's eyes is included in the range of distance "D" stated above.

This reference has met all the limitations of the claims. With regard to claims 3 and 4, this reference however does not teach explicitly that the lens pitch assumes the values of 0.124 mm or less or if the distance within the three dimensional visible range, (for either minimum distance or optimum viewing position) to be the ranges of claimed, (i.e., 213 mm or less or 350 mm or less). However, with the general equations being defined by Ichinose et al, it would have been obvious to one skilled in the art to plug in the desired values to design an image display device satisfies the specific sizes for the benefit of allowing the display devices to be applicable for different application requirements.

With regard to claims 9, 13, and 17 Ichinose et al teaches that pixel sections consists two types of pixels, one for the right eye image and one for the left eye image.

With regard to claims 10-11, 14-15 and 18-19, , Ichinose et al teaches that the optical unit is lenticular lens. Although this reference does not teach explicitly that the optical unit could also be a fly eye lens, however fly eye lens is well known in the art as an alternative lens unit for providing directivity to direct left eye and right eye images to the proper eye respectively. Since fly eye lenses comprise a plurality of convex lenses it also has the advantage of providing parallax views to more than one dimensional. Such modification would then have been obvious to one skilled in the art for the benefit of using a fly eye lenses design to achieve the stereoscopic image display and to allow the image has more than one directional parallax effect.

With regard to claims 12, 16 and 20, Ichinose et al teaches that the display device such as liquid crystal display device can be used in the stereoscopic image display apparatus.

With regard to claims 22-24, and 26-28, Ichinose et al does not teach explicitly that the stereoscopic image display device is used in a portable terminal device including the various devices claimed. However it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Madham, 2 USPQ2d 1647 (1987).

Response to Arguments

14.   Applicant's arguments filed on December 29, 2005 have been fully considered but they are not persuasive. The newly amended have been fully considered and they are rejected for the reasons stated above.

15.   Applicant's arguments drawn to the newly amended features have been fully addressed in the paragraphs above.

16.   The applicant is respectfully noted that the claimed three dimensional image display device is a

most common type of stereoscopic display device utilizing lenticular screen. The applicant being one

skilled in the art must understand any stereoscopic image display device utilizing a display device having

pixel sections and utilizing lenticular screen inherently and implicitly define a space for allowing

stereoscopic image viewing, and the space, having a maximum and minimum viewing distance, is totally

determined by the geometry of the arrangement of the pixels section and the lenticular screen and their

relative distance. The claimed equations and conditions are inherent properties of ANY stereoscopic

image display device using a lenticular screen. The applicant is respectfully noted that the geometry for

allowing the stereoscopic image viewing **does not** change whether the image is presented on electronic

image display or printed image, because they all have "pixels" for representing the images. The

applicant's arguments concerning **Momochi** reference is wrong if there is no light from the pixels being

refracted by the lenticular lens then there is no way for the stereoscopic image to be viewed. The

applicant is also respectfully noted that the actual size of the pixels and lenticular screen are really matters

of design choice to one skilled in the art since once the arrangement and relationship for the display

device are figured out, plug in number to make a device with actual desired size is a matters of design
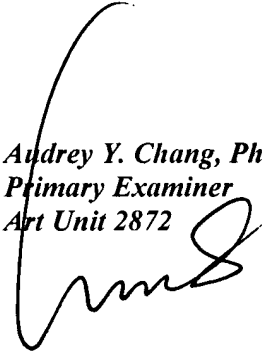
choice.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should

be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally

be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew

Dunn can be reached on 571-272-2312. The fax phone number for the organization where this

application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application

Information Retrieval (PAIR) system. Status information for published applications may be obtained

from either Private PAIR or Public PAIR. Status information for unpublished applications is available

through Private PAIR only. For more information about the PAIR system, see http://pair-

direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.